AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claim 1 (Currently amended): A method comprising:

~~applying a spreading code to a block of information bearing symbols to form a set of chips for each symbol;~~

applying a user-specific orthogonal spreading code to a block of K information bearing symbols to form a set of M chips for each symbol;

storing the chips in an array having M columns and K+L rows, where L is a function of a channel length of a wireless communication channel;

selectively interleaving the chips from the chip sets; and

generating a transmission signal from the interleaved chips.

Claim 2 (Currently Amended): The method of claim 1,

wherein the wireless communication comprises a frequency selective communication channel, and

wherein applying the spreading code comprises an orthogonal spreading code selected such that the interleaved chips retain their orthogonality after passing ~~through a~~ through the frequency selective communication channel.

Claim 3 (Currently Amended): The method of claim 1, further comprising communicating the transmission signal ~~through a~~ through the wireless communication medium.

Claim 4 (Cancelled).

Claim 5 (Currently amended): The method of claim [[4]] 1, wherein generating the transmission signal further comprises:

padding each column of the array with L guard chips; and

generating the transmission signal by reading the chips from the array in column wise fashion.

Claim 6 (Original): The method of claim 5, wherein the guard chips comprise null values.

Claim 7 (Original): The method of claim 5, wherein the guard chips are selected from a common modulation constellation.

Claim 8 (Original): The method of claim 1 further comprising:

receiving the signal; and

de-interleaving the chips from the received signal.

Claim 9 (Original): The method of claim 8 further comprising separating the data according to a user.

Claim 10 (Original): The method of claim 9, wherein separating the data comprises applying a matched filter and a single-user decoding technique.

Claim 11 (Currently amended): The method of claim 8, wherein de-interleaving the data comprises storing the chips in an array having M columns and K+L rows, wherein ~~L is a function of the communication channel length~~ and M represents a number of spreading codes within ~~the~~ a set of spreading codes, and further wherein the M chips within each row of the array correspond to a common symbol.

Claim 12 (Original): The method of claim 11, wherein de-interleaving the data further comprises producing a stream of chips by reading the array in row wise fashion.

Claim 13 (Original): The method of claim 12, further comprising:

applying a matched filter to the stream of chips to separate signals from different users based on their code orthogonality and produce a stream of user-specific symbols;

applying a single-user detecting scheme to remove channel effects and output user-specific symbol estimates; and

converting the stream of user-specific symbol estimates into a serial data stream.

Claim 14 (Currently amended): A computer-readable medium having instructions thereon to cause a programmable processor to:

~~apply a user-specific spreading code to a block of information-bearing symbols to form a set of chips for each symbol;~~

apply a user-specific orthogonal spreading code of length M to a block of K information-bearing symbols to form a set of M chips for each symbol; and

store the chips in an array having M columns and K+L rows, where L is a function of the communication channel length;

select chips from the chip sets to produce a stream of chips in which the chips from different sets are interleaved; and

generate a transmission signal from the stream of interleaved chips.

Claim 15 (Original): The computer-readable medium of claim 14 further including instructions to cause the processor to transmitting the signal through a wireless communication channel.

Claim 16 (Cancelled).

Claim 17 (Currently amended): The computer-readable medium of claim ~~16~~ 14 further including instructions to cause the processor to:

pad each column of the array with L guard chips; and

generate the transmission signal by reading the chips from the array in column wise fashion

Claim 18 (Currently amended): A computer-readable medium having instructions to cause a processor to:

receive a signal having interleaved chips generated from a block of K information-bearing symbols;

write the interleaved chips column-wise into an array such that each row contains chips generated from the same received symbol, wherein the array has M columns and K+L rows, wherein L is a function of the communication channel length and M represents a number of spreading codes within the set of spreading codes; and

produce a stream of de-interleaved chips by reading the rows of the array.

Claim 19 (Currently amended): The computer-readable medium of claim 18, ~~wherein the instructions cause the processor to configure the array to have M columns and K+L rows, wherein L is a function of the communication channel length and M represents a number of spreading codes within the set of spreading codes, and further~~ wherein the M chips within each row of the array are generated from a common received symbol, ~~which a weighted superposition of several transmitted symbols giving rise to intersymbol interference.~~

Claim 20 (Original): The computer-readable medium of claim 18, wherein the instructions cause the processor to:

apply a matched filter to the stream of de-interleaved chips to produce a stream of user-specific symbols;

apply a single-user channel equalization and symbol detection scheme to remove channel effects and output user-specific symbol estimates; and

convert the stream of user-specific symbol estimates into a serial data stream.

Claim 21 (Currently amended): A transmitting device comprising:

a block-spreading unit to form a set of M chips for each symbol of a block of K information-bearing symbols and to produce a stream of chips in which the chips from different sets of chips are interleaved and separated by L guard chips, wherein L is a function of a channel length of a wireless communication; and

a pulse shaping unit to generate a transmission signal from the stream of interleaved chips.

Claim 22 (Currently amended): The transmitting device of claim 21, wherein the block-spreading unit comprises:

a symbol-spreading unit to generate M user-specific orthogonal spreading chips for each symbol within the block of K symbols;

a buffer to store the sets of chips; and

a chip-interleaving unit to read chips from the buffer and output a stream of chips in which the chips from different sets are interleaved.

Claim 23 (Currently amended): The transmitting device of claim 22, wherein the buffer stores the chips in an array having M columns and K+L rows, where ~~L is a function of the communication channel length and~~ M represents a maximum number of users.

Claim 24 (Currently amended): The transmitting device of claim ~~23~~ 21, wherein the buffer pads each column of the array with L guard chips.

Claim 25 (Currently amended): The transmitting device of claim ~~24~~ 21, wherein the chip-interleaving unit reads the chips from the array in column wise fashion.

Claim 26 (Cancelled).

Claim 27 (Original): The transmitting device of claim 22, wherein the transmitting device comprises a cellular phone.

Claim 28 (Currently amended): A system comprising:

~~a transmitter to transmit a signal according to interleaved chips generated from a block of symbols; and~~

a transmitter to transmit a signal through a wireless communication channel according to interleaved chips generated from a block of K information-bearing symbols, wherein the transmitter interleaves the chips in an array having M columns and K+L rows, where L is a function of a channel length of the wireless communication channel and M represents a maximum number of users; and

a receiver to receive the signal and de-interleave the chips.

Claim 29 (Original): The system of claim 28, wherein the transmitting device comprises

a block-spreading unit to form a set of chips for each symbol of the block and to produce a stream of chips in which the chips from different sets are interleaved; and

a pulse shaping unit to generate the signal from the stream of interleaved chips.

Claim 30 (Currently amended): The system of claim 29, wherein the block-spreading unit comprises:

a symbol-spreading unit to generate user-specific orthogonal spreading ~~chips~~ codes for each symbol within the block of symbols;

a buffer to store the sets of chips in the array form; and

a chip-interleaving unit to read chips from the buffer and output a stream of chips in which the chips from different sets are interleaved.

Claim 31 (Cancelled).

Claim 32 (Original): The system of claim 28, wherein the receiver comprises:

a block separator to store the interleaved chips column-wise into an array such that each row contains chips generated from the same received symbol with intersymbol interference, and to produce a stream of de-interleaved chips by reading the rows of the array;

a single-user detector to apply a matched filter to the stream of de-interleaved chips to produce a stream of user-specific symbols; and

a single-user channel equalization and symbol detection scheme to remove channel effects and output the estimated symbols.

Claim 33 (Currently amended): The system of claim ~~31~~ 32, wherein ~~the receiver comprises a~~ single-user detector ~~that~~ achieves performance equivalent to a set of M single user detectors.

Claim 34 (New): A system comprising:

a transmitter to transmit a signal according to interleaved chips generated from a block of symbols; and

a receiver to receive the signal and de-interleave the chips, wherein the receiver comprises:

a block separator to store the interleaved chips column-wise into an array such that each row contains chips generated from the same received symbol with intersymbol interference, and to produce a stream of de-interleaved chips by reading the rows of the array;

a single-user detector to apply a matched filter to the stream of de-interleaved chips to produce a stream of user-specific symbols; and

a single-user channel equalization and symbol detection scheme to remove channel effects and output the estimated symbols, wherein the single-user detector that achieves performance equivalent to a set of M single user detectors.